BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268–0001

POSTAL RATE AND FEE CHANGES, 2000

Docket No. R2000–1

## UNITED STATES POSTAL SERVICE
## INTERROGATORIES AND REQUESTS FOR PRODUCTION OF DOCUMENTS TO
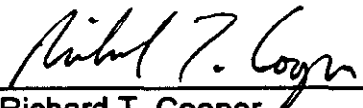## MPA WITNESS CROWDER
## (USPS/MPA-T5-23-28)

Pursuant to rules 25 and 26 of the Rules of Practice and Procedure, the United States Postal Service directs the following interrogatories and requests for production of documents to MPA witness Crowder: USPS/MPA-T5-23-28. To the extent that any particular question in this set may be read to require disclosure of confidential information in violation of Presiding Officer's Ruling No. R2000-1/27, it is requested that an unredacted response containing the confidential information be filed under seal in conformance with Ruling 27 and provided to the Postal Service.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

Daniel J. Foucheaux, Jr.
Chief Counsel, Ratemaking

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USP3/MPA-T5-23.   Consider the following regression model:

$$Y_i = \beta X_i + \varepsilon_i$$

Please recognize that this is the population regression equation in which $\beta$ is the parameter which captures the deterministic portion of the relationship between Y and X, not an estimated coefficient.  Please also recognize that $\varepsilon$ is the stochastic disturbance in the regression model and not a residual from a least squares regression.  This means that if $\beta$ were known, then for any given value of $X_i$ and $\varepsilon_i$, the corresponding value of $Y_i$ can be calculated without error.[1]

In this model, Y is the dependent variable, X is the independent variable and $\varepsilon$ is a zero mean, constant variance stochastic error term.  Let the value of the actual (not estimated) $\beta$ be equal to 0.45.

a.      Confirm that there is no intercept in this model.  If you cannot confirm, please provide the analytical expression for the intercept.

b.      Confirm that if the value for X were zero, the model would predict a value of zero for Y.  If you cannot confirm, please provide what you think is the correct prediction of Y given a value of X of zero and the mathematical formula underlying that prediction.

c.      Confirm that $\beta$ is the actual, not estimated, slope of the regression line and that the slope is equal to 0.45.  If you do not confirm, provide what you think is the slope of the regression line and the mathematical formula underlying that slope.

d.      You are given the following values for X and $\varepsilon$.  Confirm that the actual values of Y generated by this model (with $\beta$ = 0.45) for these values of X and $\varepsilon$ are as shown in the following table.  If you do not confirm, please provide what you think are the true values for Y given these values for X and $\varepsilon$ and the mathematical formula underlying those values.

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[1]      For a further discussion of the population regression equation, see, William H. Greene, Econometric Analysis, Macmillan, 1993 at 143.

| ε | X | Y |
|---|---|---|
| 3.0224 | 122 | 57.9224 |
| -14.1576 | 455 | 190.5924 |
| 0.244257 | 177 | 79.89426 |
| 1.276474 | 289 | 131.3265 |
| -12.257 | 550 | 235.243 |
| 1.733133 | 113 | 52.58313 |
| -2.18359 | 399 | 177.3664 |
| -0.23418 | 255 | 114.5158 |
| 1.095023 | 446 | 201.795 |
| -11.548 | 337 | 140.102 |
| 6.9887 | 108 | 55.5887 |
| 2.278 | 111 | 52.228 |
| -1.84691 | 140 | 61.15309 |
| -0.97763 | 155 | 68.77237 |

e.  Confirm that an ordinary least squares regression (including an intercept) of Y on X (as shown in d., above) would yield the following coefficient and t-statistics (within two decimal places):

| | Intercept | Estimated β |
|---|---|---|
| Coefficient | 5.913 | 0.4201 |
| t-statistic | 2.409 | 51.2396 |

If you do not confirm, please provide what you think the estimated coefficients and t-statistics are and attach regression output supporting your results.

USPS/MPA-T5-24. Consider a simple route with five SDR stops. Further suppose that the "true" load time (as you define it in footnote 1 on page 2 of your testimony) at a stop is given by:

$$LT = 3 + 0.5 * V - 0.002 * V^2$$

a.  Given that each of the 5 stops have the following volume, confirm that the "true" load time at each stop is as shown below. If you do not confirm, please provide what you think the "true" load time for each stop would be and the mathematical formula supporting that calculation.

| Stop | Volume | Load Time |
|---|---|---|
| 1 | 5 | 5.450 seconds |
| 2 | 7 | 6.402 seconds |
| 3 | 3 | 4.482 seconds |
| 4 | 8 | 6.872 seconds |
| 5 | 0 | 0.000 seconds. |

b.      Please confirm that the total load time for the route is 23.206 seconds. If you do not confirm, please provide what you think that route's load time is along with a mathematical formula supporting that conjecture.

c.      Now suppose that all of the existing volume stays on the route, but two additional pieces are added. Further suppose that they both go to stop 5, the previously uncovered stop. Confirm that the load time at stop 5 rises to 3.992 seconds. If you do not confirm, please provide what you think that additional load time is along with a mathematical formula supporting that conjecture.

USPS/MPA-T5-25.   Please refer to footnote 1 on page 1 of Appendix B to your testimony. There you indicate that you will use, in your regression equation, possible deliveries as a proxy variable for the two missing workload variables, "route volumes and number of actual deliveries."

a.      Please provide the econometric conditions under which a variable can serve as a effective "proxy" for an omitted variable. Include citations to the econometric literature to justify your statement of conditions.

b.      Please provide a list of criteria you use in choosing a particular proxy variable.

c.      If the proxy variable is not correlated with the omitted variable, can it serve as an effective proxy variable? Why or why not?

d.      Is "possible deliveries" a better proxy for "route volumes" or for the "number of actual deliveries." Why?

e.      Would it be feasible to use possible deliveries as a proxy for actual deliveries?

f.      Are there any criteria under which a variable could not serve as a proxy variable for an omitted variable?

g.      Are the econometric qualities of a regression with an omitted variable affected by the quality and choice to the proxy variable? If so, please provide the qualities that are affected. If not, please explain why one is not free to use any variable as a proxy variable with no impact on the estimated regression.

USPS/MPA-T5-26.   Please refer to the regression equation presented on page 4 in Appendix B to your testimony.

a.      How long did it take you (in person hours) to estimate the regression?

b.      Confirm that you (or others directed by you) did not run any other regressions on the ES data other than the one appearing on page 4 of appendix B. If you do not

confirm, please provide a listing of all other regression equations that you ran on the ES data along with the program listing and logs.

c.   Did anyone assist you in estimating the regression on page 4 or any other regressions on the ES data?  If so, please provide the names of the people who assisted you, the qualifications of those individuals, the type of assistance they provided you and the amount of time they assisted you.

d.   Please provide the date when you started the estimation process that lead to the regression on page 4 in Appendix B to your testimony and the date when that work was completed.

USPS/MPA-T5-27. Please provide a list of all published econometric studies that you have authored or coauthored.

USPS/MPA-T5-28.  Please refer to the regression presented in on page 4 of Appendix B of your testimony.  For that regression please provide:
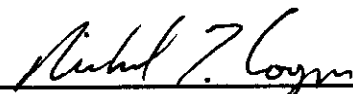
a   A general description of the program that estimated that regression including the objectives of the program and the processing tasks performed.

b.   Any methods and procedures employed, along with a listing of the input and output data, in machine readable form.

c.   A listing of the source code in hardcopy and machine readable form.

d.   For all input data:

    1.   Designation of all sources of such data.

    2.   Explanations of any modifications to such data made for use in the
            program

e.   Definitions of all input and output variables or sets of variables.

f.   A description of input and output data file organization.

g.   For all source codes, documentation sufficiently comprehensive and detailed to satisfy generally accepted software documentation standards appropriate to the type of program and to its intended use in the proceedings:

h.   All pertinent operating system and programming language manuals.

i.   If the requested program is user interactive, a representative sample program run, together with any explanation necessary to illustrate the response sequence.

j.   A presentation of the economic theory underlying the econometric study,

k.   A complete description of:

    a.   the econometric model(s) 31(k)(2)(iii)(b), and

    b.   the reasons for each major assumption and specification 31(k)(2)(iii)(b),

l.   The definition of the variables selected and the justification for their selection,

m.   For any alternative model whose computed econometric results influenced the choice of the preferred model:

    1.   a statement of the reasons for rejecting that alternative,

    2.   an identification of any differences between that alternative and the preferred model with respect to variable definitions, equation forms, data or estimation methods, and

    3.   the computed econometric results for that alternative.

n.   For every econometric technique used in the estimation process and the reasons for selecting each:

    1.   a reference to a detailed description in a text, manual, or technical journal, or

    2.   a description and analysis of the technique that is sufficient for a technical evaluation.

o.   A complete report of the econometric results, including, where applicable,

    1.   coefficient estimates,

    2.   standard errors and t-values,

    3.   goodness-of-fit statistics,

    4.   other appropriate test statistics,

    5.   the variance/covariance matrix of the estimates, and

    6.   computed residuals for results computed from samples composed of fewer than 250 observations.

p.      Descriptions of all statistical tests of hypotheses and the results of such tests.

## CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.

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